



Caltrans Division of Research,
Innovation and System Information

Research Results

Transportation
Safety and
Mobility

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Project Title:
C1 Traffic Detector Reader/Analyzer

Task Number: 1546

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Product Category: New equipment

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C1 Traffic Detector Reader and Analyzer

New hardware tool helps diagnose problems with traffic detectors

WHAT WAS THE NEED?

Efficiently managing and operating California's highway system requires accurate, timely, and reliable information on traffic speed and flow. This information is derived from data collected throughout the state by either loop detectors installed in the pavement or roadside side-fire radar. However, many of the traffic sensors do not operate properly, making the data unreliable. To maximize the return on the investment made in these traffic detectors, tools are needed that can diagnose and fix the problems.

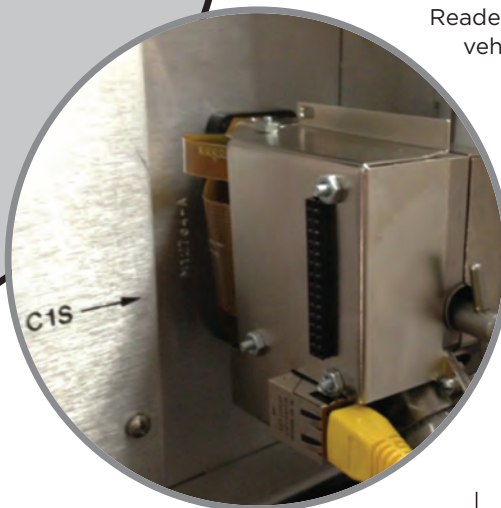
WHAT WAS OUR GOAL?

The goal was to create a hardware tool to help troubleshoot and diagnose problems with traffic detectors so that they can be fixed.

WHAT DID WE DO?

The researchers developed the C1 Traffic Detector Reader and Analyzer (C1 Reader), which consists of a flexible cable that taps into the existing C1 cable and connector that carry the detector's signal outputs to the traffic signal controller where they are processed. In this manner, the C1 Reader does not interfere with the normal operation of the vehicle detection system.

To install the C1 Reader, a technician simply removes the C1 cable from its connector, slides the flexible C1 Reader cable over the connector pins, and then reconnects the C1 cable to the connector. The C1 Reader converts the raw detector data to digital format and transmits it through a wired or wireless Internet interface back to a remote data server, where it is stored in a database. A technician can then use the VideoSync software tool, which was developed simultaneously under a different task, to evaluate the performance of the vehicle detection system.



The C1 Reader attaches to the left side of the existing C1 connector. The flexible cable taps into the signals in the C1 connector.



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WHAT WAS THE OUTCOME?

The C1 Reader collects higher quality traffic data, because it uses the detector's raw output rather than the aggregated data of the vehicle detection system. The higher quality data enables Caltrans to:

- Improve detector accuracy by enabling better calibration
- Diagnose detector anomalies in real time
- Derive accurate speed and vehicle classifications from single loop installations

The next phase of the project will reduce the space needed around the C1 connector, because some signal controller models did not have enough clearance to fit the C1 Reader between the connector and controller frame. It will also be designed to use the electrical power of the signal controller rather than the more challenging Power over Ethernet approach in the current design. With these changes, the next version of the C1 Reader should be ready for deployment after additional field testing.

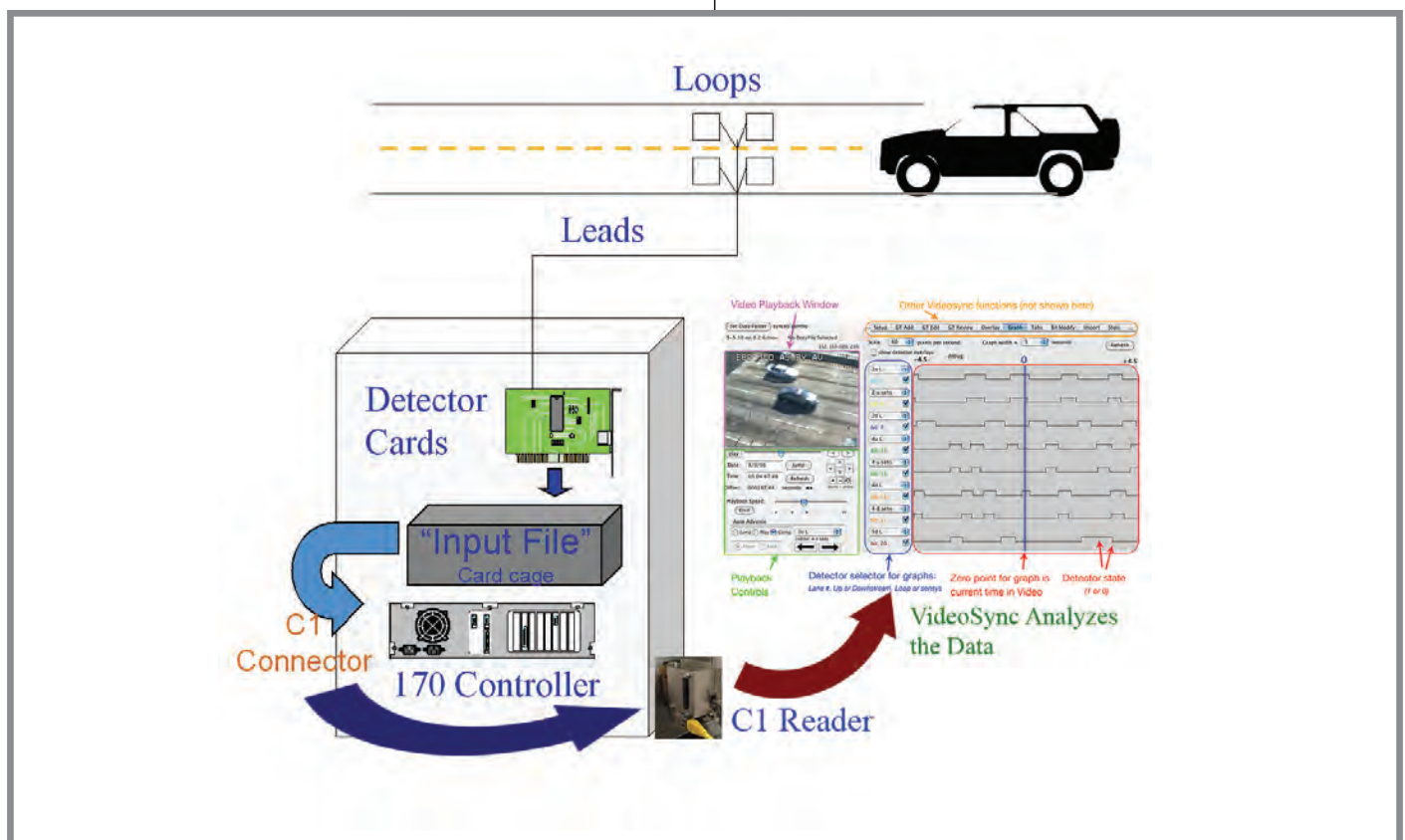
WHAT IS THE BENEFIT?

The statewide vehicle detection system provides important data to help assess and manage roadway usage, traffic flow, and congestion. The C1 Reader, when combined with the VideoSync software tool, enables Caltrans to troubleshoot and diagnose problems with vehicle detection stations so that they can be quickly repaired. These diagnostic tools also allow installers to verify and validate the correct operation of a new vehicle detection station when it is being turned on for the first time so that it can be put immediately to use. The new tools maximize the investment in the vehicle detection stations by making sure that they are operating correctly.

LEARN MORE

To view the research:

www.dot.ca.gov/research/operations/loopreader/index.htm



The C1 Reader collects the sensor data and transmits it to the VideoSync program.